METALS USED FOR CASTING

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REQUIREMENTS OF CASTING ALLOYS

- High strength and hardness
- Tarnish and corrosion resistance
- Acceptable fluidity and castabilty
- Can be soldered or welded
- Can add porcelain if needed
- Biocompatible with soft and hard tissue
- Easily finished and polished
- Can be burnished

Classification of alloys

- According to noble metal content
- -high noble ≥ 60%, AuPd, PlAuPdAg
- -noble 25% with no requirement of Au, AgPd
- -base metal less than 25 noble, NiCr, CoCr
- -titanium alloys

Classification of alloys

- According to mechanical properties(gold alloy)
- -type I: soft, used for small four walled cavites
- -type II: medium, used for complex restoration
- -type III: hard, used in Cr & Br
- -type IV: extra hard, used with RPD

Comparison between gold and base metal alloys

Gold alloy	Base metal alloy
Yellow colour	Silver colour
18.3gm/cm3	7-9gm/cm3
935-1150 C	1150-1400 C
1.6% casting shrinkage	2.4 %casting shrinkage
Low modulous of elastisity	High modulous of elastisity
Ductile and can be burnished	Inductile and can not be burnished

SPRUING

- It's the process of adding a sprue former to the wax pattern before investing and casting.
- The purpose of the sprue former is to create a channel trough which the molten alloy mat enter the mold during casting.

Requirements of the sprue former

- Allows the escape of molten wax
- Allows molten alloy to flow into the mold
- Alloy in sprue must remain molten for a longer time than the alloy in the mold (reservoir)

Types of sprues

- According to material:
- 1-metallic sprue former:
- - rust proof to prevent contamination
- - hollow or solid
- - easily removed but if the solid is used and it is forgotten then no casting failure will occur

Types of sprues

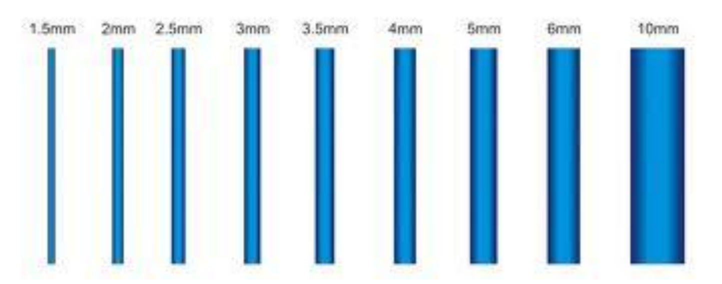
- 2- plastic sprue former:
- - requires higher melting temperature than wax, thus residual plastic may remain causing some casting failures.
- Are rigid so do not distort like wax

Types of sprues

- 3- wax sprue former:
- - most widely used, has same melting temp of wax pattern therefore the errors possible are reduced
- Comes in several ready made diameters

Sprue formers





Sprue former diameter

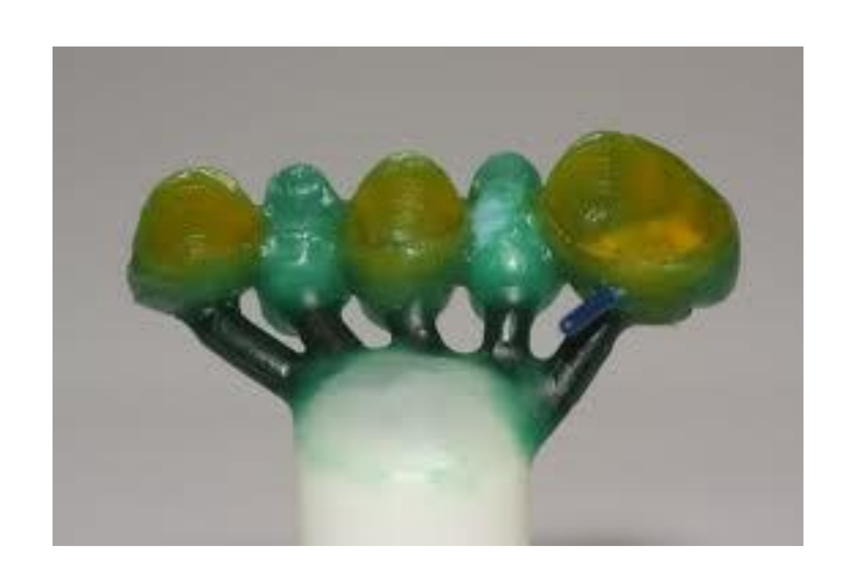
- - as a general rule the diameter of the sprue former should be the same thickness or larger than the thickest part of the wax pattern
- -2.5mm for molars/CM
- -2mm for premolars/partial coverage
- -too large will distort wax pattern
- -too small will not allow molten alloy to flow, unless pressure is applied


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- Sprue former is attached to the thickest non functional cusp
- For anterior restorations at the mid incisal area
- Point of attachement should be flared to avoid constriction and turbulence
- The length of the sprue former will depend on the length of the ring and the type of the investment material used.
- Gypsum investment 6-8 mm
- Phosphate bonded 3-4mm
- Accessory or venting sprues can be used to allow casting of thin section

- Direct sprueing uses with gold alloy
- Indirect sprueing uses base metal alloy to prevent oxides from contaminating the cast
- Indirect sprueing can use feeder, horizontal and oblique sprues









Crucible former

- It is usually made of rubber can be made from wood, metal, plastic
- It creates a funnel at the end of the sprue to allow entery of the molten alloy

Crucible former





Crucible former





Crucible former



